SEQUENCE LISTING

(1) GENERAL INFORMATION:

 (i) APPLICANT: IMMER, Hansueli
     FORSSMANN, Wolf-Georg
     ADERMANN, Knut
     KLESSEN, Christian

 (ii) TITLE OF INVENTION: PROCESS AND INTERMEDIATE PRODUCTS FOR PREPARING CARDIODILATIN FRAGMENTS AND HIGHLY PURIFIED CARDIODILATIN FRAGMENTS

 (iii) NUMBER OF SEQUENCES: 11

 (iv) CORRESPONDENCE ADDRESS:
   (A) ADDRESSEE: Nikaido, Marmelstein, Murray & Oram LLP
   (B) STREET: 655 Fifteenth Street, N.W., Suite 330
   (C) CITY: Washington
   (D) STATE: D.C.
   (E) COUNTRY: USA
   (F) ZIP: 20005-4810

 (v) COMPUTER READABLE FORM:
   (A) MEDIUM TYPE: Floppy disk
   (B) COMPUTER: IBM PC compatible
   (C) OPERATING SYSTEM: PC-DOS/MS-DOS
   (D) SOFTWARE: PatentIn Release #1.0, Version #1.30

 (vi) CURRENT APPLICATION DATA:
   (A) APPLICATION NUMBER: US 09/027,777
   (B) FILING DATE: 23-FEB-1998
   (C) CLASSIFICATION:

 (vii) PRIOR APPLICATION DATA:
   (A) APPLICATION NUMBER: DE 44 20 381.0
   (B) FILING DATE: 02-JUN-1994

 (vii) PRIOR APPLICATION DATA:
   (A) APPLICATION NUMBER: DE 195 13 784.1
   (B) FILING DATE: 10-APR-1995

 (viii) ATTORNEY/AGENT INFORMATION:
   (A) NAME: Kitts, Monica C.
   (B) REGISTRATION NUMBER: 36,105
   (C) REFERENCE/DOCKET NUMBER: P1614-8019

 (ix) TELECOMMUNICATION INFORMATION:
   (A) TELEPHONE: (202) 638-5000
   (B) TELEFAX: (202) 368-4810

(2) INFORMATION FOR SEQ ID NO:1:

 (i) SEQUENCE CHARACTERISTICS:
   (A) LENGTH: 17 amino acids

```
        (B)  TYPE: amino acid
        (C)  STRANDEDNESS:
        (D)  TOPOLOGY: linear

   (ii) MOLECULE TYPE: peptide



   (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

   Cys Phe Gly Gly Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly
   1                   5                   10                  15

   Cys
```

(2) INFORMATION FOR SEQ ID NO:2:

```
   (i) SEQUENCE CHARACTERISTICS:
        (A)  LENGTH: 15 amino acids
        (B)  TYPE: amino acid
        (C)  STRANDEDNESS:
        (D)  TOPOLOGY: linear

   (ii) MOLECULE TYPE: peptide



   (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

   Leu Arg Ala Leu Leu Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser
   1                   5                   10                  15
```

(2) INFORMATION FOR SEQ ID NO:3:

```
   (i) SEQUENCE CHARACTERISTICS:
        (A)  LENGTH: 5 amino acids
        (B)  TYPE: amino acid
        (C)  STRANDEDNESS:
        (D)  TOPOLOGY: linear

   (ii) MOLECULE TYPE: peptide



   (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

   Asn Ser Phe Arg Tyr
   1                   5
```

(2) INFORMATION FOR SEQ ID NO:4:

```
   (i) SEQUENCE CHARACTERISTICS:
```

        (A) LENGTH: 19 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: peptide

  (ix) FEATURE:
        (A) NAME/KEY: Peptide
        (B) LOCATION: 1
        (D) OTHER INFORMATION: /note= "Xaa is an amino acid chain
having chain length 0 - 15 amino acids."

  (ix) FEATURE:
        (A) NAME/KEY: Peptide
        (B) LOCATION: 17
        (D) OTHER INFORMATION: /note= "Xaa is an amino acid chain
of 0 - 5 amino acids."

  (ix) FEATURE:
        (A) NAME/KEY: Cross-links
        (B) LOCATION: 2..18

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Xaa Cys Phe Gly Gly Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu
1   5   10   15

Gly Cys Xaa

(2) INFORMATION FOR SEQ ID NO:5:

  (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 32 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

  (ii) MOLECULE TYPE: peptide

  (ix) FEATURE:
        (A) NAME/KEY: Cross-links
        (B) LOCATION: 11..27

  (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
1   5   10   15

Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Tyr
            20   25   30

(2) INFORMATION FOR SEQ ID NO:6:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 14 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 1
        (D) OTHER INFORMATION: /product= "Modified by a Boc protecting group and a
tBu protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 4
        (D) OTHER INFORMATION: /note= "Modified by a tBu protecting group and a Pbf
protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 7
        (D) OTHER INFORMATION: /note= "Modified by a Pbf protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 8
        (D) OTHER INFORMATION: /note= "Modified by a Pbf protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 9
        (D) OTHER INFORMATION: /note= "Modified by a tBu protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 10
        (D) OTHER INFORMATION: /note= "Modified by a tBu protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 11
        (D) OTHER INFORMATION: /note= "Modified by a Acm protecting group"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

    Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly
    1   5   10

(2) INFORMATION FOR SEQ ID NO:7:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 12 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 1
        (D) OTHER INFORMATION: /product= "Modified by a Fmoc protecting group and a
Pbf protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 3
        (D) OTHER INFORMATION: /product= "Modified by a OtBu protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 4
        (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 8
        (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 9
        (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

    Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly
    1   5   10

(2) INFORMATION FOR SEQ ID NO:8:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 6 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide

    (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 1
        (D) OTHER INFORMATION: /note= "Modified by an Fmoc protecting group or H"

```
(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 1
     (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 2
     (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 3
     (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 5
     (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 6
     (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

(ix) FEATURE:
     (A) NAME/KEY: Modified-site
     (B) LOCATION: 6
     (D) OTHER INFORMATION: /note= "Modified by an O-OH or an O-OtBu protecting
group"


(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Cys Asn Ser Phe Arg Tyr
1               5

(2) INFORMATION FOR SEQ ID NO:9:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 18 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: peptide


    (ix) FEATURE:
         (A) NAME/KEY: Modified-site
         (B) LOCATION: 1
         (D) OTHER INFORMATION: /note= "Modified by an H or an Fmoc protecting group"

    (ix) FEATURE:
         (A) NAME/KEY: Modified-site
         (B) LOCATION: 1
```

(D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 3
    (D) OTHER INFORMATION: /product= "Modified by a OtBu protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 4
    (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 8
    (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 9
    (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 13
    (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 14
    (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 15
    (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 17
    (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

(ix) FEATURE:
    (A) NAME/KEY: Modified-site
    (B) LOCATION: 18
    (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group and an
OtBu protecting group"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Arg Met Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe
1   5   10   15

Arg Tyr

(2) INFORMATION FOR SEQ ID NO:10:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 32 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

   (ii) MOLECULE TYPE: peptide

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 1
        (D) OTHER INFORMATION: /product= "Modified by a Boc protecting group and a tBu protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 4
        (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 5
        (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 7
        (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 8
        (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 9
        (D) OTHER INFORMATION: /product= "Modified by a Bu protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 10
        (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 11
        (D) OTHER INFORMATION: /product= "Modified by a Acm protecting group"

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 15

            (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 17
            (D) OTHER INFORMATION: /product= "Modified by a OtBu protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 18
            (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 22
            (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 23
            (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 27
            (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 28
            (D) OTHER INFORMATION: /product= "Modified by a Trt protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 29
            (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 31
            (D) OTHER INFORMATION: /product= "Modified by a Pbf protecting group"

    (ix) FEATURE:
            (A) NAME/KEY: Modified-site
            (B) LOCATION: 32
            (D) OTHER INFORMATION: /product= "Modified by a tBu protecting group and an
OtBu protecting group"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

    Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
    1   5   10   15

    Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Tyr
                20   25   30

(2) INFORMATION FOR SEQ ID NO:11:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 32 amino acids
        (B) TYPE: amino acid
        (C) STRANDEDNESS:
        (D) TOPOLOGY: linear

   (ii) MOLECULE TYPE: peptide

   (ix) FEATURE:
        (A) NAME/KEY: Modified-site
        (B) LOCATION: 11
        (D) OTHER INFORMATION: /product= "Modified by a Acm protecting group"

   (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Thr Ala Pro Arg Ser Leu Arg Arg Ser Ser Cys Phe Gly Gly Arg Met
1   5   10   15

Asp Arg Ile Gly Ala Gln Ser Gly Leu Gly Cys Asn Ser Phe Arg Thr
        20   25   30